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“Probing the nature of the compact object in the gamma-ray binaries”

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The gamma-ray binaries, the recently identified subclass of the X-ray binaries, show variable emissions in the wide range band, from radio to the TeV gamma-rays. Currently, 5 systems are classified as the gamma-ray binaries, among which 4 systems have the compact object of unknown nature, whilst their optical counterparts are well-known as massive stars ($M > 10M_{\text{sun}}$). There are two competing models, the pulsar wind model and the microquasar model, is proposed to explain the gamma-ray binaries. Although a plenty of both theoretical and observational studies have been done, the nature of the compact object is still under discussion for four systems. Hence the mechanisms for particle acceleration and very high energetic emissions are still one of the big challenge of the this field. We have monitored two gamma-ray binaries, LS I +61 303 and HESS J0632+057, to probe the nature of the compact object. The optical counterpart in the two systems is a Be star, a B-type star with geometrically thin circumstellar disk. We focus on the interaction between the optical star, in particular the circumstellar disk, and the compact object, which effects on the structure of the disk. Our high-dispersion spectroscopic and polarimetric monitoring shows the evidence for that the compact object is pulsar in these systems.